

Indian tribes living in the desert climates of northern Mexico and the southwestern United States have traditionally relied on 7 basic plants for medicinal uses. They are:

Prickly Pear Cactus, Agave, Yucca, Cholla Cactus, Ocotillo, Mesquite and Creosote bush.

While the Indians of the wetter climates relied on herbal medicines, the Indians of the desert lands were forced to come up with a completely new set of plants for medicinal purposes. The herbs of other tribes were certainly used when available, but for the most part, these herbs simply do not grow in the arid lands. There isn't enough water to support those plants.

The hunter-gatherer tribes of the American deserts certainly know how to grow crops, but evidence suggests little or no organized farming took place prior to the arrival of the Spaniards.

Here is a brief summary of the medicinal uses of the seven basic plants:

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## Mesquite



A tea made from the bark or dried leaves of mesquite is commonly used to treat bladder infections.



The black gum nodes, boiled into a liquid, relieve the symptoms of chapped lips, rashes and sunburn.



Those same black nodes are also placed on sore gums of an Indian baby to ease the pain of teething. Caution: Use sparingly, because that same black gum is also used as a laxative!

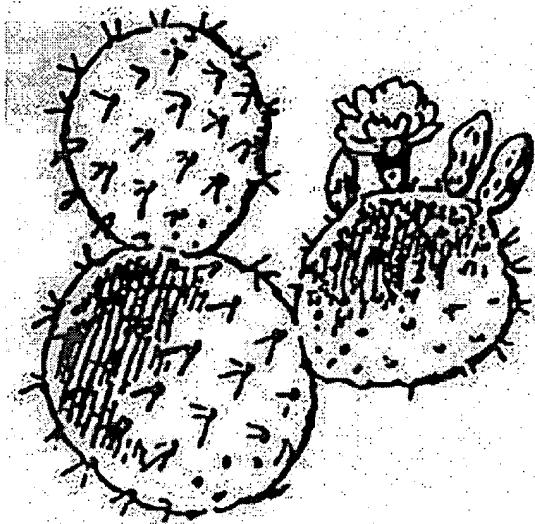



Dried mesquite leaves are ground into a powder. Water is added and the mixture is used as an eye wash for sore eyes and pinkeye.





The inner yellow sap wood induces vomiting.


## Prickly Pear (*Opuntia*)




 A pad, broken off, is passed over an open fire to burn off the spines, then split in half, warmed (20 seconds in a microwave oven) and bound to the chest with a cloth to relieve rheumatic and asthmatic symptoms.

 Similarly, earaches are treated by cleaning a pad, cutting it in half, warming it and placing it over the ear...a very effective remedy!

 Likewise, hemorrhoids are relieved with a pad of prickly pear, cleaned, split and warmed.

 The gooey juice of prickly pear cactus is used as a very soothing skin lotion for minor rashes, sunburn, and winburn.

 Snakebites, and insect bites, burns, rashes, sunburn and minor abrasions are all treated with a poultice made from cleaned prickly pear Cactus.

## Agave



A compress for local infections and fresh wounds is made out of the wet macerated pulp obtained from the heart of the Agave.



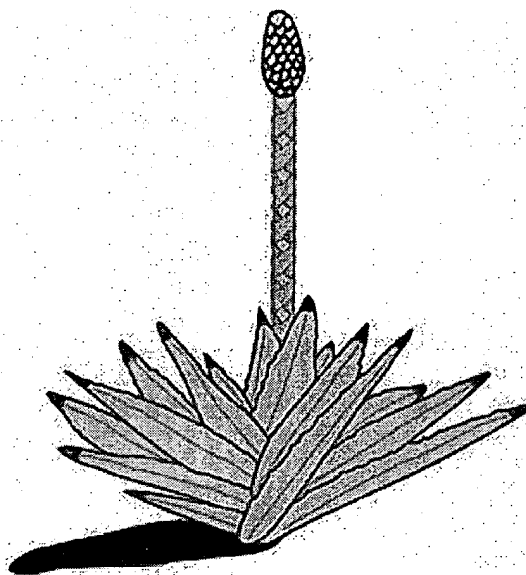
Similarly, such a compress is used for relieving chest congestion.



Raw Agave leaves induce vomiting.



The pulp of the heart of the Agave is also used to treat chapped lips, rashes, sunburn and snowblindness.



Black ashes of Yucca are made into a paste by mixing them with water. This is then smeared over the entire body to break a fever.



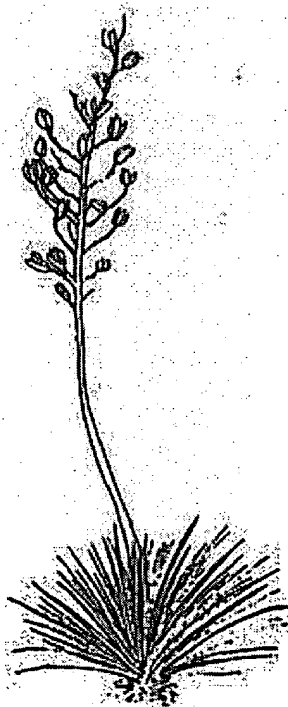
Diuretics and emetics are commonly made from both the root and leaves of the Yucca.



Dandruff and associated hair and scalp problems are effectively treated by making a shampoo of the root of many varieties of Yucca.



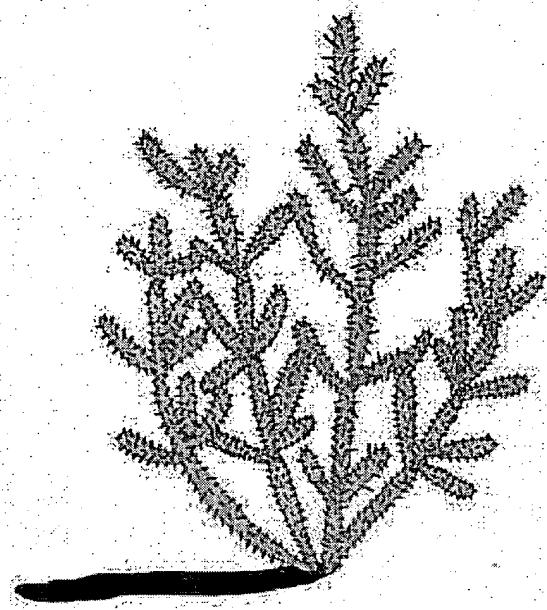
The young shoots of Yucca serve as a pain reliever when mashed and boiled. Water is added to the boiled leaves or chopped up root sections of the plant induce vomiting.



## Yucca

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## Cholla (*Cylindropuntia*)



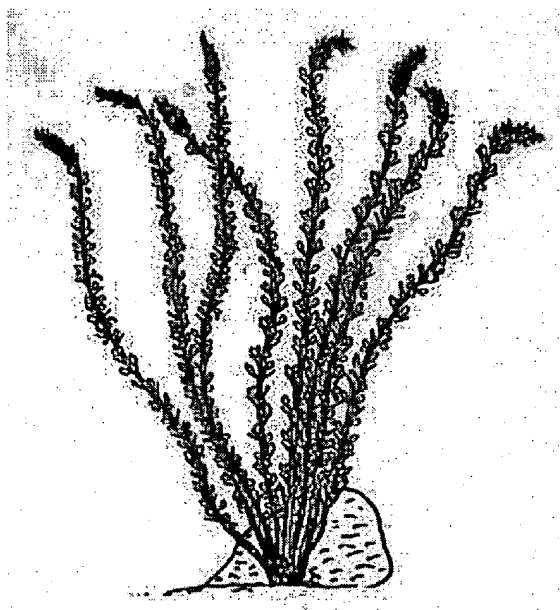
The Hopis chew on the roots of cholla Cactus to treat diarrhea.



The Navajos commonly use poultices made of the cleaned joints of cholla Cactus. They are despined, split lengthwise, heated and applied to relieve the pain of arthritis.

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## Ocotillo (*Fouqueria splendens*)



The Apaches effectively relieve fatigue by bathing in water which contains the crushed roots or flowers of the Ocotillo.



Many Indian tribes report that the flowers and roots of Ocotillo are commonly placed over fresh wounds to stem bleeding.

## Creosote Bush (*Larrea tridentata*)



An Apache Indian one told me that if I would chew and swallow a piece of a branch of Creosote bush (*Larrea tridentata*), it would cure my diarrhea. I did...and it did!



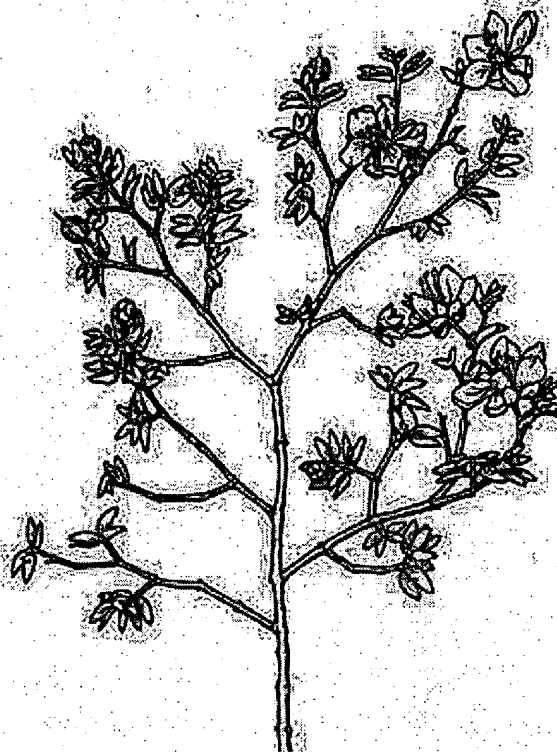
A strong tea made of dried creosote bush leaves are commonly used to treat the common cold.



The resinous leaf nodes soothe bruises and wounds.



A tea made from leaves of creosote bush and sweetened with a spoonful of honey, greatly relieve kidney pain.



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Generally speaking, small dosages of these plants are sufficient and **correct identification** of all plants is **imperative**! If you have the slightest doubt about a plant, don't use it!

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## OPUNTIA

[illegible]

\*\*\*\*\*AMERICAN JOURNAL OF CHINESE MEDICINE\*\*\*\*\*

MECKES-LOZOYA M IBANEZ-CAMACHO R

HYPOGLUCAEMIC ACTIVITY OF OPUNTIA STREPTACANTHA THROUGHOUT ITS ANNUAL CYCLE.

In: Am J Chin Med (1989) 17(3-4):221-4

ISSN: 0192-415X

*Opuntia* sp. used in Mexican traditional medicine diminishes blood sugar levels when orally administered. Possible seasonal variations in the hypoglycaemic property of *Opuntia streptacantha* Lemaire, were studied using the fresh sap of its stems collected throughout the year. The evaluation was performed in the already proven sensitive experimental model in normal rabbits. No seasonal variation in the hypoglycaemic activity of this plant product was detected suggesting it can be used year round for the treatment of Diabetes mellitus.

[illegible]

MECKES-LOZYO A M ROMAN-RAMOS R

**OPUNTIA STREPTACANTHA: A COADJUTOR IN THE TREATMENT OF DIABETES MELLITUS.**

In: Am J Chin Med (1986) 14(3-4):116-8

ISSN: 0192-415X

This report describes the effect produced by the complementary daily administration of *Opuntia streptacantha* sap to a diabetic volunteer being under treatment with chlorpropamide. The plant product improved remarkably the general symptomatology of the patient as well as his insulin and glucose blood levels.

Registry Numbers:

11061-68-0 (Insulin)

94-20-2 (Chlorpropamide)

[illegible]

\*\*\*\*\*ARCHIVOS DE INVESTIGACION MEDICA\*\*\*\*\*

Frati-Munari AC Licona-Quesada R Araiza-Andraca CR Lopez-Ledesma R

Chavez-Negrete A

### [Activity of *Opuntia streptacantha* in healthy individuals with induced hyperglycemia]

### Accion de *Opuntia streptacantha* en individuos sanos con hiperglucemia inducida.

In: Arch Invest Med (Mex) (1990 Apr-Jun) 21(2):99-102

ISSN: 0066-6769 (Published in Spanish)

Hypoglycemia effect *Opuntia streptacantha* which occur in diabetic has not been found in healthy subjects. To find out if this effect appears also in healthy individuals if they are hyperglycemic, two tests were performed to 7 healthy volunteers. In both tests 500 ml of 20% dextrose were infused in two hours, 500 g of *O. streptacantha* were given orally before one test, and 400 ml of water as control were given before the other one. Serum glucose was measured every 30 minutes during three hours. Glucose rising was significantly ( $P$  less than 0.025) lower with *Opuntia* than in control test at 90 and 120 minutes ( $143 \pm 58$  vs  $193 \pm 9$  and  $135 \pm 25$  vs  $163 \pm 13$  mg/dl respectively). Area under curve of glucose was also smaller in *Opuntia* than in control test ( $P$  less than 0.05).

Hypoglycemic effect of *O. streptacantha* also occur in healthy subjects in hyperglycemia is present.

[illegible]

FRATI-MUNARI AC ALTAMIRANO-BUSTAMANTE E RODRIGUEZ-BARCENAS N  
ARIZA-ANDRACA R  
LOPEZ-LEDESMA R

## [HYPOGLYCEMIC ACTION OF OPUNTIA STREPTACANTHA LEMAIRE: STUDY USING RAW EXTRACTS]

**Accion hipoglucemiante de *Opuntia streptacantha* Lemaire: investigacion con extractos crudos.**

In: Arch Invest Med (Mex) (1989 Oct-Dec) 20(4):321-5.

ISSN: 0066-6769 (Published in Spanish)

To find out the extent of the hypoglycemic effect of crude extracts of *Opuntia streptacantha* eight patients with type II diabetes mellitus were studied. Five tests were performed to each patients with the intake of (A) supernatant, (B) precipitate, (C) complete homogenate of 500 g of crude *O. streptacantha* stem (D) 400 ml of water, and (E) 500 g of broiled *Opuntia* stems. Serum glucose levels were measured at 0,30,60,120 and 180 minutes. Crude extracts did not cause a significant decrease of glycemia, and the results were similar to the water control test ( $P$  greater than 0.05). The intake of broiled *Opuntia* stems caused a significant decrease of serum glucose level, that reached  $48.3 \pm 16.2$  mg/dl lower than basal values at 180 minutes ( $P$  less than 0.01). Perhaps heating of *O. streptacantha* is necessary to obtain the hypoglycemic effect.

[illegible]

FRATI-MUNARI AC RIOS GIL U ARIZA-ANDRACA CR ISLAS ANDRADE S LOPEZ  
LEDESMA R

[DURATION OF THE HYPOGLYCEMIC ACTION OF OPUNTIA STREPTACANTHA LEM.]

### Duración de la acción hipoglucemiante de *Opuntia streptacantha* Lem.

In: Arch Invest Med (Mex) (1989 Oct-Dec) 20(4):297-300

ISSN: 0066-6769 (Published in Spanish)

To assess the duration of *Opuntia streptacantha* Lem. hypoglycemic effect, two tests in fasting conditions, one with the intake of 500 g of broiled *Opuntia* stems and the other one with 400 ml of water as control, were performed in eight type II diabetics. Serum glucose levels were measured hourly during six hours. In the *Opuntia* test the decrease of serum glucose levels was more pronounced at the fourth hour (P less than 0.01 vs control test), serum glucose levels remained unchanged the following two hours. No significant changes on glycemia occurred in the control test. Difference between both tests was significant from the second to the sixth hour.

[illegible]

IBANEZ-CAMACHO R ROMAN-RAMOS R  
HYPOGLYCEMIC EFFECT OF OPUNTIA CACTUS.

In: Arch Invest Med (Mex) (1979) 10(4):223-30

ISSN: 0066-6769 (Published in English and Spanish)

Nopal (*Opuntia* sp.) has been traditionally used by the Mexican population for the treatment of diabetes mellitus. The purpose of this work is to describe

[illegible]

ISSN: 0066-6769 (Published in Spanish)

[illegible]

ISSN: 0066-6769 (Published in Spanish)

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FRATI AC XILOTL DIAZ N ALTAMIRANO P ARIZA R LOPEZ-LEDESMA R  
THE EFFECT OF TWO SEQUENTIAL DOSES OF OPUNTIA STREPTACANTHA UPON  
GLYCEMIA.

In: Arch Invest Med (Mex) (1991 Jul-Dec) 22(3-4):333-6

ISSN: 0066-6769

To find out if a second dose of *O. streptacantha* may enhance its hypoglycemic effect, three tests were performed in fasting condition to 8 type II diabetic subjects and 6 healthy individuals. The tests were as follows: A. 500 g of broiled stems of *O. streptacantha* were given orally initially and two hours later. B. Only the initial dose. C. Control test with water. Serum glucose and C peptide were measured every two hours from 0 to 6 hours. In diabetic patients a significant ( $P < 0.01$  vs control) decrease of serum glucose reaching from 41 to 46% less than initial value, was noticed in tests A and B, without differences between them. C peptide did not change. In healthy subjects serum glucose and C peptide did not significantly differ between tests. A second dose of *O. streptacantha*, two hours after the first one, did not improve its hypoglycemic activity.

[illegible]

\*\*\*\*\*DIABETES CARE\*\*\*\*\*

FRATI-MUNARI AC GORDILLO BE ALTAMIRANO P ARIZA CR  
HYPOGLYCEMIC EFFECT OF OPUNTIA STREPTACANTHA LEMAIRE IN NIDDM.

In: Diabetes Care (1988 Jan) 11(1):63-6

ISSN: 0149-5992

To assess the hypoglycemic effect of the nopal *Opuntia streptacantha* Lemaire (*O. streptacantha* Lem.), three groups of patients with non- insulin-dependent diabetes mellitus (NIDDM) were studied. Group one (16 patients) ingested 500 g of broiled nopal stems. Group 2 (10 patients) received only 400 ml of water as a control test. Three tests were performed on group 3 (6 patients): one with nopal, a second with water, and a third with ingestion of 500 g broiled squash. Serum glucose and insulin levels were measured at 0, 60, 120, and 180 min. After the intake of *O. streptacantha* Lem., serum glucose and serum insulin levels decreased significantly in groups 1 and 3, whereas no similar changes were noticed in group 2. The mean reduction of glucose reached 17.6  $\pm$  2.2% of basal values at 180 min in group 1 and 16.2  $\pm$  1.8% in group 3; the reduction of serum insulin at 180 min reached 50.2  $\pm$  8.0% in group 1 and 40.3  $\pm$  12.4% in group 3. This study shows that the stems of *O. streptacantha* Lem. cause a hypoglycemic effect in patients with NIDDM. The mechanism of this effect is unknown, but an increased insulin sensitivity is suggested.

### Registry Numbers:

11061-68-0 (Insulin)

[illegible]

\*\*\*\*\*JOURNAL OF ETHNOPHARMACOLOGY\*\*\*\*\*

IBANEZ-CAMACHO R MECKES-LOZOYA M MELLADO-CAMPOS V  
THE HYPOGLUCEMIC EFFECT OF OPUNTIA STREPTACANTHA STUDIED IN  
DIFFERENT ANIMAL  
EXPERIMENTAL MODELS.

In: J Ethnopharmacol (1983 Mar) 7(2):175-81

ISSN: 0378-8741

Studies performed with *Opuntia streptacantha* sap in three different animal species using several experimental conditions are described. The *Opuntia* sap induced hypoglucemic effects when orally administered to intact animals under induced states of moderate increase of blood sugar. In normoglucemic and pancreatectomized animals the effect of the product was not detected. The results validate the popular use of this plant for treatment of Diabetes mellitus symptomatology.

[illegible]

\*\*\*\*\*INTERNATIONAL JOURNAL OF SYSTEMATIC BACTERIOLOGY\*\*\*\*\*  
 PHAFF HJ STARMER WT LACHANCE MA GANTER PF  
 CANDIDA CASEINOLYTICA SP. NOV., A NEW SPECIES OF YEAST OCCURRING IN  
 NECROTIC  
 TISSUE OF OPUNTIA AND STENOCEREUS SPECIES IN THE SOUTHWESTERN UNITED  
 STATES AND  
 BAJA CALIFORNIA, MEXICO.  
 In: Int J Syst Bacteriol (1994 Oct) 44(4):641-5  
 ISSN: 0020-7713

We describe *Candida caseinolytica*, a new yeast species which occurs in rotting tissues of opuntias and other cacti in the North American Sonoran Desert and a few other localities. This small-celled, slowly growing yeast does not ferment any sugar and assimilates a limited number of carbon compounds, including 2- and 5-ketogluconic acids. It exhibits strong extracellular proteolytic activity on casein at pH 6.5, but gelatin is not hydrolyzed or is only weakly hydrolyzed by a few strains. The type strain of *C. caseinolytica* is strain UCD-FST 83-438.3 (= ATCC 90546 = CBS 7781).

[illegible]

\*\*\*\*\*JOURNAL OF NUTRITION\*\*\*\*\*  
 FERNANDEZ.ML TREJO A MCNAMARA DJ  
 PECTIN ISOLATED FROM PRICKLY PEAR (OPUNTIA SP.) MODIFIES LOW DENSITY  
 LIPOPROTEIN  
 METABOLISM IN CHOLESTEROL-FED GUINEA PIGS.  
 In: J Nutr (1990 Nov) 120(11):1283-90  
 ISSN: 0022-3166

The effect of prickly pear soluble fiber on low density lipoprotein (LDL) metabolism was investigated by feeding male guinea pigs either a nonpurified diet containing 0.25% cholesterol (HC diet) or the HC diet + 1% prickly pear pectin (HC-P diet). Plasma cholesterol levels were significantly decreased by the HC-P diet, with a 33% decrease in LDL levels ( $p$  less than 0.02) and an increase in LDL density. Hepatic free and esterified cholesterol levels were reduced 40 and 85%, respectively ( $p$  less than 0.002), by the HC-P diet. Hepatic microsomal 3-hydroxy-3-methylglutaryl coenzyme A reductase levels were not different.  $^{125}\text{I}$ -LDL binding to hepatic membranes was increased 1.7-fold by the HC-P diet ( $p$  less than 0.001), with receptor affinity ( $K_d$ ) being unaltered and receptor number ( $B_{\text{max}}$ ) being significantly increased ( $p$  less than 0.001). These data suggest that prickly pear pectin may act by a mechanism similar to that of bile acid-binding resins in lowering plasma cholesterol levels. The observed reduction in LDL and hepatic cholesterol levels and increase in LDL density and hepatic apolipoprotein B/E receptors are responses suggesting an increased demand on hepatic cholesterol from increased excretion of bile acids and interruption of the enterohepatic circulation.

Registry Numbers:

### EC 1.1.1.88 (Hydroxymethylglutaryl CoA Reductases)

57-88-5 (Cholesterol)

[illegible]

FERNANDEZ ML LIN EC TREJO A MCNAMARA DJ  
 PRICKLY PEAR (OPUNTIA SP.) PECTIN ALTERS HEPATIC CHOLESTEROL  
 METABOLISM WITHOUT  
 AFFECTING CHOLESTEROL ABSORPTION IN GUINEA PIGS FED A  
 HYPERCHOLESTEROLEMIC DIET.

In: J Nutr (1994 Jun) 124(6):817-24

ISSN: 0022-3166

Prickly pear pectin intake decreases plasma LDL concentrations by increasing hepatic apolipoprotein B/E receptor expression in guinea pigs fed a hypercholesterolemic diet. To investigate whether prickly pear pectin has an effect on cholesterol absorption and on enzymes responsible for hepatic cholesterol homeostasis, guinea pigs were fed one of three semipurified diets, each containing 15 g lard/100 g diet: 1) the lard-basal diet with no added cholesterol or prickly pear pectin (LB diet); 2) the LB diet with 0.25 g added cholesterol/100 g diet (LC diet); or 3) the LC diet containing 2.5 g prickly pear pectin/100 g diet, added at the expense of cellulose (LC- P diet). Animals fed the LB diet had the lowest plasma LDL and hepatic cholesterol concentrations, followed by animals fed the LC-P diet ( $P < 0.001$ ). Hepatic 3-hydroxy-3-methylglutaryl CoA (HMG-CoA) reductase activity was highest in the group fed the LB diet, with similar values for animals in the other two groups. A positive correlation existed between plasma LDL cholesterol concentration and hepatic acyl CoA:cholesterol acyltransferase activity ( $r = 0.87$ ,  $P < 0.001$ ). Cholesterol absorption was not different among the three dietary groups. These results indicate that the decreased plasma and hepatic cholesterol concentrations of animals fed prickly pear pectin are not explained by differences in cholesterol absorption but rather are due to mechanisms that alter hepatic cholesterol homeostasis, resulting in lower plasma LDL concentrations.

Registry Numbers:

### EC 1.1.1.88 (Hydroxymethylglutaryl CoA Reductases)

EC 2.3.1.26 (Cholesterol Acyltransferase)

[illegible]

FERNANDEZ ML LIN EC TREJO A MCNAMARA DJ  
PRICKLY PEAR (OPUNTIA SP.) PECTIN REVERSES LOW DENSITY LIPOPROTEIN  
RECEPTOR  
SUPPRESSION INDUCED BY A HYPERCHOLESTEROLEMIC DIET IN GUINEA PIGS.

In: J Nutr (1992 Dec) 122(12):2330-40

ISSN: 0022-3166

The effects of prickly pear pectin on plasma LDL metabolism were investigated by feeding guinea pigs either a diet containing 15 g/100 g lard and 0.25 g/100 g cholesterol (LC diet) or the LC diet in which cellulose was partially replaced (2.5 g/100 g) by prickly pear pectin (LC-P diet). The LC-P diet lowered plasma LDL cholesterol concentrations by 33% ( $P < 0.001$ ). Low density lipoprotein composition was modified by intake of prickly pear pectin; the relative percentages of free and esterified cholesterol were lower and triglycerides were

higher in LDL from animals fed the LC-P diet ( $P < 0.05$ ). Intake of prickly pear pectin did not affect hepatic 3- hydroxy-3-methylglutaryl coenzyme A reductase activity; however, hepatic free and esterified cholesterol concentrations were lowered by 46 and 64%, respectively. Hepatic apolipoprotein B/E receptor expression (Bmax) was 60% higher in animals fed the LC-P diet ( $P < 0.01$ ). Similar to the in vitro data, receptor-mediated LDL fractional catabolic rates were 190% higher in animals fed the LC-P diet ( $P < 0.05$ ), whereas apolipoprotein LDL flux rates were not affected. Apolipoprotein LDL pool size and fractional catabolic rates exhibited a significant correlation ( $r = -0.52$ ,  $P < 0.01$ ). These data indicate that an increase in apolipoprotein B/E receptor expression is a major metabolic response by which intake of prickly pear pectin decreases plasma LDL concentrations.

### Registry Numbers:

### EC 1.1.1.88 (Hydroxymethylglutaryl CoA Reductases)

57-88-5 (Cholesterol)

9000-69-5 (pectin)

[illegible]

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